

CAPABILITY FOR INTEGRATED SYSTEMS RISK-REDUCTION ANALYSIS

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NASA's Human Research Program (HRP) is working to increase the likelihoods of human health and performance success during long-duration missions, and subsequent crew long-term health. To achieve these goals, there is a need to develop an integrated understanding of how the complex human physiological-socio-technical mission system behaves in spaceflight. This understanding will allow HRP to provide cross-disciplinary spaceflight countermeasures while minimizing resources such as mass, power, and volume. This understanding will also allow development of tools to assess the state of and enhance the resilience of individual crewmembers, teams, and the integrated mission system.

We will discuss a set of risk-reduction questions that has been identified to guide the systems approach necessary to meet these needs. In addition, a framework of factors influencing human health and performance in space, called the Contributing Factor Map (CFM), is being applied as the backbone for incorporating information addressing these questions from sources throughout HRP. Using the common language of the CFM, information from sources such as the Human System Risk Board summaries, Integrated Research Plan, and HRP-funded publications has been combined and visualized in ways that allow insight into cross-disciplinary interconnections in a systematic, standardized fashion. We will show examples of these visualizations. We will also discuss applications of the resulting analysis capability that can inform science portfolio decisions, such as areas in which cross-disciplinary solicitations or countermeasure development will potentially be fruitful.